with silica gel or controlled pore glass. The silica gel employed is silica gel having an average particle diameter of from about 3 to about 70 microns and an average pore size of from about 50 to about 1000, preferably about 50 to about 250 Angstrom units.

The particulate controlled pore glass useful as a starting material in this invention is CPG having an average particle diameter is about 37 to about 177 microns and an average pore size of from about 40 to about 1000 Angstrom units.

The silica bonded phase products of this invention are prepared in accordance with the following steps:

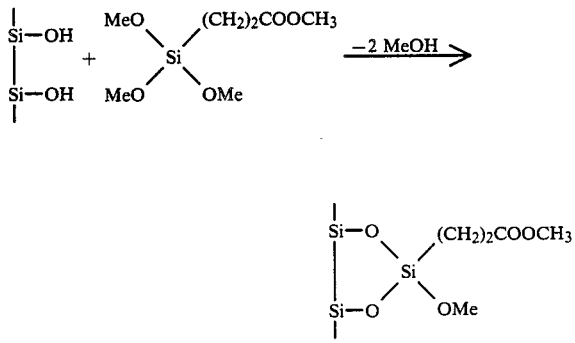
A. reacting either particulate silica gel having an average particle diameter of from about 3 to about 70 microns and an average pore size of from about 50 to about 1000 Angstrom units, or particulate controlled pore glass having an average particle diameter of from about 37 to 177 microns and an average pore size of from about 40 to about 1000 Angstroms, in an inert organic solvent slurry, with a carobalkoxyalkyl silane of the formula as set forth hereinbefore, said reaction being conducted as ambient to refluxing temperature for about 2 to about 50 hours;

B. recovering the resultant solid fraction from the reaction mixture; and

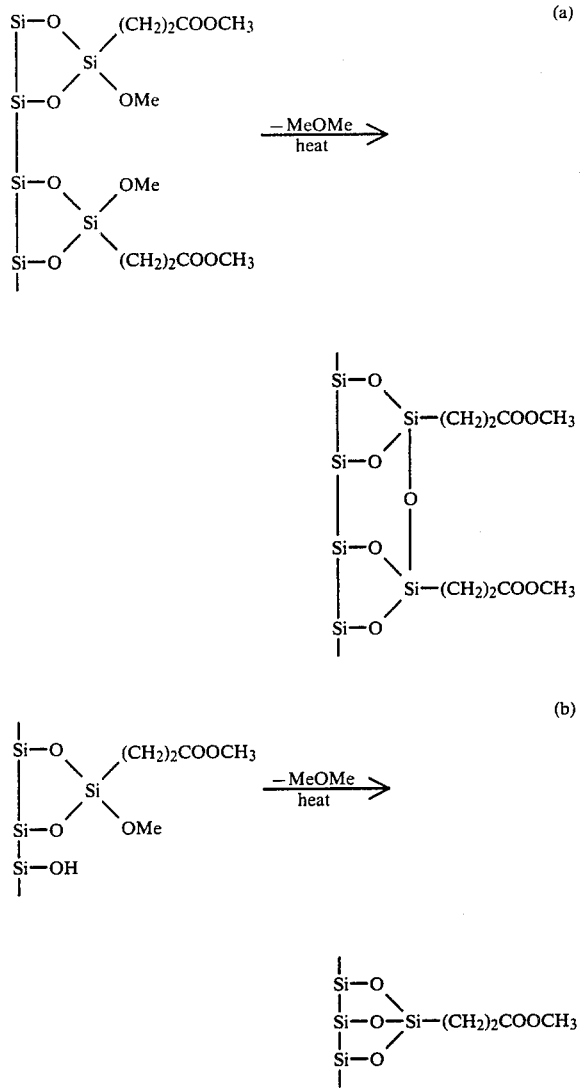
C. heating said solid fraction at a temperature and for a time sufficient to dry and completely bond the silane to the respective silica gel or controlled pore glass.

Without being bound thereby, it is believed that the reaction proceeds to completion in two steps as follows, in which a carbomethoxyethyl trimethoxysilane is employed as an exemplary reactant:

Step 1: Silica hydroxyls and the methoxy groups on the silane react to form Si—O—Si bonds and free methanol, with some residual methoxy groups remaining unreacted:




Step 2: Completion of the reaction with the residual methoxy groups is effected during heat curing by (a) and (b):




Such products are suitable for use as chromatographic column packing according to this invention. However, it is preferred that such products be end capped, that is, react the unreacted silanol groups with, for example, trimethyl chlorosilane or hexamethyldisilizane in order to render the silanols inert.

Silica gel, consisting of amorphous silica, is commercially available in irregular and spherical particulate forms and in several commercial grades with mesh sizes ranging from 3 through 325 (ASTM). Rather than relying upon a numerical indication of mesh size, however, more accurate indicia for purposes of this invention are the average diameter and average pore size of the silica gel particles, respectively, from about 3 to about 70 microns and from about 50 to about 1000, preferably 50–250 Amgstrom units.

Controlled pore glass (CPG), which is a silicate containing support material chemically similar to silica for use in liquid chromatography, is commercially available, for example, from the Pierce Chemical Co., Rock-